

REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 3-6, 8-11, 13-16, 18-22, 24-27 and 29-32 are pending, with Claims 1, 3-4, 6, 8-9, 11, 13-14, 16, 18-19, 22, 24-25, 27 and 29-30 amended and Claims 2, 7, 12, 16, 23, and 28 canceled by the present amendment.

In the outstanding Official Action, Claims 1-5 are rejected under 35 U.S.C. §102(b) as being anticipated by Ye et al. (USP No. 6414788) published July 2, 2002. Claims 6-32 are presently withdrawn from consideration.

Applicants acknowledge with appreciation the personal interview between the Examiner and Applicants' representative on March 16, 2006. During the interview, Applicants' Figure 6, Claim 1 (amended to recite the features of original Claim 2) and the feedback circuit of Ye were contrasted. The Examiner acknowledged that Ye does not disclose or suggest Applicants' claimed control parameter adjustment, as represented by item 19f of Figure 6.

Also discussed during the interview was the previously applied restriction/election. The Examiner agreed to reconsider the question of which claims may be rejoined for further prosecution on the merits.

Claims 1, 6, 11, 16, 22 and 27 are amended to recite the features of Claims 2, 7, 12, 17, 23, and 28, respectively. Claims 3-4, 8-9, 13-14, 18-19, 24-25 and 29-30 are amended to maintain antecedent basis. No new matter is added.

Briefly recapitulating, amended Claim 1 is directed to an optical amplifying method in which at least one optical amplifier is connected to an optical transmission line, an optical signal transmitted to the optical transmission line is amplified by the optical amplifier while an optical power of the optical signal on the optical transmission line is detected, and gain of

the optical amplifier is controlled in response to an optical power of thus detected. The method includes the steps of: a) detecting an optical input and output power of the optical amplifier; b) obtaining a difference between gain of the optical amplifier and target gain on a basis of detected optical input and output power; c) implementing a proportional calculation and an integral calculation of the difference by an automatic constant gain control device to obtain a drive current of at least one pump laser diode provided in the optical amplifier; d) controlling gain of the optical amplifier by controlling current of the pump laser diode based on a calculated drive current value; and e) adjusting control parameters of the automatic constant gain control device in response to a detected result obtained by detecting the optical input power to the optical amplifier. The drive current of the pump laser diode is obtained by the automatic constant gain control device with the control parameters adjusted. The present application allows for dynamic control over feed forward/feedback gain adjustment.

Ye describes optical amplifiers that use a hypertransient control scheme. Optical taps may be used to tap the main fiber path through the amplifier before and after the gain stage. The gain stage may be provided by one or more rare earth doped fiber coils such as erbium-doped fiber coils. The coils may be pumped by laser diodes or other suitable pumps. The optical output power of the pumps may be controlled by a controller. The controller may calculate the appropriate power to be applied by the pumps based on the measured input and output signal powers of an amplifier. The control process implemented by the controller may be based on a combination of feedback and feed-forward control techniques.¹

In step 80 of the process of Ye, the calculated feedback pump contribution and the calculated feed-forward pump contribution may be used to generate a desired value at which to drive the pump. A function that may be used is shown in equation 4 of Ye. As an example, the desired value may be calculated by linearly combining the calculated feedback

¹ Ye, Abstract.

pump contribution and the calculated feed-forward pump contribution. At step 82, the pump power calculated at step 80 may be adjusted to ensure that pump 56 operates within normal operating limits. At step 84, pump 56 may be driven at a calculated pump power level by supplying an appropriate drive signal to pump 56 using controller 52, digital to analog converter 72 and pump driver 74. By combining both feedback and feed-forward contributions when determining the level at which to drive the pump, drawbacks associated with using pure feedback and pure feed-forward approaches are avoided.² The calculated feedback pump contribution is based on a proportional integral derivative (PID) method, with parameters α , β and γ . Parameters α , β and γ are determined experimentally.³

However, as noted during the interview, and contrary to the Official Action's assertion relative to now cancelled Claim 2, Ye does not disclose or suggest adjusting control parameters of the automatic constant gain control device in response to a detected result obtained by detecting the optical input power to the optical amplifier. For a non-limiting example of Applicants' claimed control parameter adjustment, Applicants direct attention to gain adjusting circuit 19f shown in Applicants' originally filed Figure 6. Ye discloses the control process implemented by the controller may be based on a combination of feedback and feed-forward control techniques. The feedback control technique of Ye cited in the Official Action is a PID (proportional-integral-derivative) control technique that includes fixed/*predetermined* values proportional/integral parameters (α , β and γ) and does not include adjusting/adjustable parameters as recited in Applicants' now pending independent claims. Because the values of Ye are *predetermined*, they are fixed and are not *adjusted* in real time as recited in Applicants' amended independent claims.

MPEP § 2131 notes that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art

² Ye, column 6, line 63 through column 7, line 37.

³ Ye, column 6, lines 52-63.

reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art.” *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in “at least one of two-digit, three-digit, or four-digit” representations, was held anticipated by a system that offsets year dates in only two-digit formats). See also MPEP § 2131.02. “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Because Ye does not disclose or suggest all the features recited in Applicants’ independent Claims, Ye does not anticipate the invention recited in these independent claims, and all claims depending therefrom.

Regarding withdrawn Claims 6, 8-11, 13-22, 24-27 and 29-32, Applicants note that independent Claims 11 and 22 are directed to an apparatus and system corresponding to the method recited in Claim 1. Furthermore, independent Claim 6, 16 and 27 are directed to a corresponding method, apparatus, and system, albeit with the additional limitation of “inputting/outputting optical signals of prescribed wavelengths to/from said optical transmission line by said optical wavelength division-multiplexing device.” Independent Claims 16 and 27 differ from Claims 11 and 22 in a similar fashion. Independent Claims 21 and 32 also recite features similar to those of Claim 1. In view of these similarities, Applicants respectfully request rejoinder of withdrawn Claims 6, 8-11, 13-22, 24-27 and 29-32.

Application No. 10/775,103
Reply to Office Action of December 22, 2005.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Bradley D. Lytle
Attorney of Record
Registration No. 40,073

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)
MM/rac

I:\ATTY\MM\257706US-AM1.DOC

Michael E. Monaco
Registration No. 52,041